

One baitboat sent from Japan, to provide technical training, and four other vessels (three Ecuadorian and one Colombian) will conduct fishing for the company out of Buenaventura. The planned catch during the first year is 3,000 tons of skipjack worth about \$1.5 million. The new company plans to build in Buenaventura a 1,000-ton capacity cold storage plant, which reportedly will be the largest cold storage in Colombia.

Source: *Suisan Keizai Shimbun*.

JAPAN IMPORTS LESS SALMON

Japanese salmon imports were sharply down last year owing to poor harvest in the United States and Canada, the two major suppliers, and the depressed market in Japan. In recent years, between 5,000 and 8,000 tons of salmon were imported annually,

and in 1973 the purchases jumped to 15,000 tons. Sharp gains in 1973 were attributed to increased consumption in Japan of salmon and other North Pacific species which gained popularity as "clean" fish amidst the uproar over local fish contamination by PCB, mercury and other pollutants, and to heavy buying by trading firms speculating on sharp price increases for salmon.

However, in 1974, the Japanese salmon market weakened, adversely affected by the tight money situation and consumer resistance to high-value seafood. This situation, coupled with high prices in the salmon producing countries because of poor fishing, discouraged the trading firms from importing the product which they could not sell at above cost. Total Japanese salmon imports in 1974 to 30 September 1974 were 2,990 metric tons.

Source: *Suisan Keizai Shimbun*.

Publications

Recent NMFS Scientific Publications

NOAA Technical Report NMFS SSRF-677. Gilmore, Gil, and Lee Trent. "Abundance of benthic macroinvertebrates in natural and altered estuarine areas." April 1974. 13 p.

ABSTRACT

The abundance of benthic macroinvertebrates during March-October 1969 in West Bay, Tex., was compared between 1) a natural marsh area, 2) an adjacent marsh area altered by channelization, bulkheading, and filling, and 3) an open bay area. Animals representing four phyla were caught. Abundance indices (areas combined) of the four groups in terms of numbers were 66.4 percent polychaetes, 29.6 percent crustaceans, 2.5 percent pelecypods, and 1.5 percent nemerteans; volumes were 44.0 percent polychaetes, 40.8 percent pelecypods, 10.7 percent nemerteans, and 4.4 percent crustaceans.

When all organisms were combined, they were slightly more abundant numerically and over twice as abundant volumetrically in the marsh than in the canals and were least abundant in the bay. Polychaetes were most abundant in the canals and least abundant in the bay; abundance was highest at stations with low to intermediate amounts of silt and clay or where vegetative matter was composed mostly of live sea grasses or detritus.

Crustaceans were more abundant in the natural marsh than in the other two areas and showed a definite preference for sandy substrate in marsh areas. Pelecypods were numerically most abundant in the bay but volumetrically the marsh had the highest standing crop. Nemerteans were most abundant in the marsh and least abundant in the bay.

In general, the seasonal abundance of polychaetes and nemerteans varied little during the study, whereas crustaceans and pelecypods were abundant only during the spring and early summer. An exception to this seasonal abundance pattern was the reduction in numbers of polychaetes at the uppermost canal station where the habitat was apparently unsuitable due to low oxygen levels during the summer and early fall.

NOAA Technical Report NMFS SSRF-678. Ellis, Robert J. "Distribution, abundance, and growth of juvenile sockeye salmon, *Oncorhynchus nerka*, and associated species in the Naknek River system, 1961-64." September 1974. 53 p.

ABSTRACT

The Naknek River system contains eight interconnected and generally biologically discrete basins,

each with a different ratio of spawning grounds to rearing area for sockeye salmon, *Oncorhynchus nerka*, and different densities of juvenile sockeye salmon and associated species of fish. Juvenile sockeye salmon and other pelagic species were sampled with tow nets at night. Sockeye salmon were the most common and abundant species in all basins, followed by threespine sticklebacks, ninespine sticklebacks, and pond smelt. Eighteen other species of potential competitor or predator fish were present.

In the summers of 1961 to 1963, juvenile sockeye salmon in the pelagic areas had a characteristic pattern of abundance for the entire system: abundance (catch per tow) of age 0 increased from early summer to midsummer and then declined to late August. The abundance in late August varied about threefold and, in general, was independent of variations in the number of parents from 1960 to 1963.

In July the abundance of age 0 fish in each basin was proportional to the amount of known contiguous spawning ground, but by late August this relation no longer existed. This change was at least partly due to migration of the age 0 fish—generally from basins of greater abundance of fish to those of lesser abundance. The larger and faster growing fish were the first to migrate. Not all basins were involved in these migrations.

The production of sockeye salmon smolts in the Naknek system is relatively stable. At least three major factors probably contribute to this stability: (1) the presence of several major spawning units or races in widely separated spawning grounds of different types, (2) the presence of several connected lakes, and (3) the migratory behavior of juvenile sockeye salmon during the first summer.

A mechanism which prevents the population of juvenile sockeye salmon from exceeding some upper limit is not apparent in the Naknek system. A reduction in growth in areas of high density was not apparent in the Naknek system in 1961-64 and apparently did not occur in 1957-65. Many kinds of predators on juvenile salmon are present but probably are not limiting production of smolts.

The data on abundance and growth of juvenile sockeye salmon and the distribution of the escapement and spawning grounds indicate that it should be possible to increase the production of sockeye salmon in the Naknek system. Two of the major basins, North Arm and Brooks Lake, which constitute about 35 percent of the system, are now

producing juveniles at very low levels. North Arm appears to suffer from too little spawning area, whereas Brooks Lake appears to have adequate spawning area but too few spawners.

Three factors in the biology of juvenile sockeye salmon of the Naknek system are of special significance to the managers of the resource and should be investigated in any effort to enhance the production of sockeye salmon in the Naknek system: (1) the abundance of smolts each spring is fairly constant for the system as a whole and not closely related to the abundance of the parents or, from 1961-64, even to the original abundance of age 0 fish; (2) the apparent growth of juvenile sockeye salmon and potential competitor species is not related to the abundance of these fish in any lake of the Naknek system; and (3) two major lakes, constituting about 35 percent of the rearing waters, do not receive age 0 sockeye salmon from other basins and are supporting relatively few sockeye salmon.

The question of what escapement of adult sockeye salmon is needed to ensure full production of juveniles is considered. The present study indicates that escapements in the range of 600,000 to 1,000,000 fish, as recommended by other studies, would probably fully use the present combination of spawning and rearing areas without danger of overburdening the food supply.

NOAA Technical Report NMFS CIRC-389. Williams, Austin B. "**Marine flora and fauna of the northeastern United States. Crustacea: Decapoda.**" April 1974. 50 p.

ABSTRACT

The manual includes an introduction to general classification, an illustrated key, an annotated systematic list, a selected bibliography, and a systematic index to the marine decapod crustaceans of the inshore and continental shelf waters of the northeastern United States.

NOAA Technical Report NMFS CIRC-390. Engett, Mary Ellen, and Lee C. Thorson. "**Fishery publications, calendar year 1973: Lists and indexes.**" September 1974. 14 p.

ABSTRACT

The following series of fishery publications of the National Marine Fisheries Service, National Oceanic and Atmospheric Administration, in calendar year 1973 are

listed numerically (with abstracts) and indexed by author, subject, and geographic area: NOAA Technical Report NMFS CIRC (formerly Fishery Circular); Data Report; Fishery Facts; NOAA Technical Report NMFS SSRF; and NOAA Technical Memorandum NMFS.

NOAA Technical Report NMFS SSRF-675. Shomura, Richard S., and Francis Williams (editors). "**Proceedings of the International Billfish Symposium, Kailua-Kona, Hawaii, 9-12 August 1972. Part 2. Review and contributed papers.**" July 1974. 335 p.

(No abstract)

Data Report 85. Clark, Stephen H., Dennis A. Emiliani, and Richard A. Neal. "**Release and recovery data from brown and white shrimp mark-recapture studies in the northern Gulf of Mexico, May 1967-November 1969.**" July 1974. 152 p. on 3 microfiche. For sale by U.S. Department of Commerce, National Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22131.

ABSTRACT

During seven mark-recapture studies conducted in the northern Gulf of Mexico during the period May 1967 to November 1969, personnel at the Galveston Laboratory released 75,947 brown shrimp (*Penaeus aztecus*) and 38,628 white shrimp (*P. setiferus*) marked with biological stains, fluorescent pigments, and plastic tags. Recovery of 6,192 brown shrimp and 917 white shrimp, provided data on growth, mortality, migration, and distribution by area and depth. Data for individual recoveries and other pertinent information are summarized in this report.

Data Report 86. Weber, Douglas D. "**Observations on growth of southeastern Bering Sea king crab, *Paralithodes camtschatica*, from a tag-recovery study, 1955-65.**" August 1974. 122 p. on 2 microfiche. For sale by U.S. Department of Commerce, National Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22131.

ABSTRACT

Growth data from a 10-yr tag-recovery study of southeastern Bering Sea king crab, *Paralithodes camtschatica*, were evaluated for sources of error and the usable growth information documented.

For simplified analysis of growth data the adult male crab growth increments may be combined since the increase in carapace length per molt averages 17.5 mm irrespective of size. For female crabs the growth per molt decreases with increase in carapace length.

The crabs' migratory pattern, molting stage at time of tagging, area of recapture, and selectivity of the fishery can influence interpretation of the growth data. The interaction of these parameters are presented, and it is suggested that these factors be considered in data application.

Data Report 87. Collins, L. Alan, and John H. Finucane. "**Hydrographic observations in Tampa Bay and adjacent waters, May 1971 through April 1973.**" August 1974. 146 p. on 3 microfiche. For sale by U.S. Department of Commerce, National Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22131.

ABSTRACT

Hydrographic data are given for water temperature, salinity, dissolved oxygen and turbidity. Additional data include chlorophyll *a*, *b*, and *c*, astacin and nonastacin carotenoids, and primary productivity based on chlorophyll *a* extraction for 29 stations in Tampa Bay and the adjacent coastal waters from Clearwater south to Sarasota, Fla. Data on air temperature, water temperature, salinity, and turbidity from daily observations at three sport fishing piers are provided. Tables summarize mean, range, and number of observations for each of the parameters by the months in which sampling occurred.

Data Report 88. Petersen, Duane H. "**Trawl catches and oceanographic data from NMFS surveys of the Gulf of Alaska pandalid shrimp resource, 1970-72.**" August 1974. 573 p. on 9 microfiche. For sale by U.S. Department of Commerce, National Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22131.

ABSTRACT

Trawl catch and oceanographic data collected from five National Marine Fisheries Service cruises to assess the relative abundance of the pandalid shrimp resource in the Gulf of Alaska during 1970-72 are presented.

Station data are arranged in tabular form and provide information on location, depth, time and distance trawled, type of fishing gear

used, and species catch by weight. Bottom temperatures and salinities for some studies are also included.

Data Report 89. Turner, William R., George N. Johnson, and Herbert R. Gordy. "Compendium of juvenile menhaden surveys in coastal streams of the northern Gulf of Mexico." August 1974. 189 p. on 3 microfiche. For sale by U.S. Department of Commerce, National Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22131.

ABSTRACT

Catches of juvenile Gulf menhaden with two-boat surface trawls in coastal streams along the northern Gulf of Mexico are compiled for the period from 1964 through 1969. The catches are presented chronologically with accompanying hydrological data (including Secchi disc measurements, salinity determinations, and surface water temperatures) collected at each sampling station. Maps are provided defining the various areal designations, streams, and sampling stations.

Data Report 90. Saloman, Carl H., and L. Alan Collins. "Hydrographic observations in Tampa Bay and adjacent waters—1972." August 1974. 176 p. on 3 microfiche. For sale by U.S. Department of Commerce, National Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22131.

ABSTRACT

Hydrographic data include water temperature; salinity; total phosphorus; total Kjeldahl nitrogen; pH; dissolved oxygen; turbidity; water transparency; chlorophyll *a*, *b*, and *c*, astacin and nonastacin carotenoids; and primary productivity based on chlorophyll *a* extraction. Methods of collecting and analyzing samples are described. Tables summarize data collected from 30 permanent stations by month and area. Additional tables summarize the mean, range, and number of observations of samples taken twice daily at the Laboratory dock.

Data Report 93. Trent, Lee, Edward J. Pullen, Genevieve Adams, and Gilbert Zamora, Jr. "Catch per unit effort and mean total length of brown shrimp, *Penaeus aztecus* Ives, taken by trawl in the Galveston Bay system, Texas, 1963-67." September 1974. 42 p. on 1 microfiche. For sale by U.S. Department of Commerce, National Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22131.

ABSTRACT

This report presents catches per unit effort and mean lengths for brown shrimp, *Penaeus aztecus* Ives, taken with a trawl and trawl cod end cover from the Galveston Bay system, Tex. during 1963-67 by personnel of the Estuarine Program, National Marine Fisheries Service, NOAA, Galveston, Tex. The number of stations at which samples were taken ranged from 58 in 1963 to 16 in 1967. Sampling frequency varied from weekly to monthly; in 1967 samples were not taken throughout the year. Stations were located within three habitats—peripheral, open water, and channel—within each bay area of the system except West Bay. Catch per unit effort was defined as the number of brown shrimp caught per 5-min tow in a 0.6 × 3.0 m otter trawl and the number caught per tow in the cod end cover.

Data Report 94. Hall, John R., and William N. Lindall, Jr. "Benthic macroinvertebrates and sediments from upland canals in Tampa Bay, Florida." September 1974. 221 p. on 4 microfiche. For sale by U.S. Department of Commerce, National Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22131.

ABSTRACT

Samples from 34 stations in upland canals of Tampa Bay, Fla. contained 139 species and 66,326 specimens of benthic macroinvertebrates. Collections were made from August 1970 through November 1971. Tables give monthly counts by species, individuals, and total individuals per square meter. A summary of the total number of species and individuals, and their monthly range and mean is presented. Mean grain size, standard deviation, skewness, kurtosis, and weight

percentage of granule, sand, silt, and clay-sized sediment particles are also recorded.

NOAA Technical Memorandum NMFS ABFL-3. Bailey, Jack E., and Sidney G. Taylor. "Salmon fry production in a gravel incubator hatchery, Auke Creek, Alaska, 1971-72." November 1974, iv + 13 p.

ABSTRACT

Survival and physical characteristics of pink salmon fry, *Onchorhynchus gorbuscha*, incubated in two types of boxes, each box containing about 1 m³ of gravel, and a Heath incubator were compared with fry from natural spawning to evaluate the use of boxes to produce fry. The gravel incubators were seeded at densities of 74,200 to 198,000 eyed eggs/m³. Survival from eyed eggs to emergent fry ranged from 79 to 97 percent in artificial incubation, but the number of incubators tested was too small to define any relationships between survival and incubator type or egg density. With artificial incubation in gravel, survival from potential eggs in females to emergent fry was 69 percent, whereas with natural spawning and incubation in the creek, survival was about 12 percent.

Fry emerged from gravel incubators about 3 days earlier than from the streambed. The gravel incubator fry were larger than tray fry but smaller than creek fry. The smaller size of the gravel incubator fry could not be explained entirely on the basis of early emergence.

Further studies were recommended to determine whether the muskeg sediment that accumulated in the incubators, the low oxygen level (57 to 69 percent saturation), or the substrate particle size and composition inhibited growth of the embryos.

Floating Breakwaters, Fisherman Ecology Are Subjects of Two New URI Volumes

The Proceedings of the 1974 Conference on Floating Breakwaters are available from the University of Rhode Island Sea Grant program. Papers printed in the 304-page proceedings cover the topics of theoretical treatment of the different modes of wave suppression, experiments performed on model and prototype breakwaters, descriptions and evaluations of commercially available floating breakwaters, materials for breakwater construction, and the economics of floating breakwaters.

The proceedings also contain a list of conference participants and a suggested list of nomenclature for use by researchers. Editor of the breakwater conference report is Tadeusz Kowalski, URI professor of ocean engineering. The Floating Breakwaters Conference was held last spring (1974) at Newport, R. I. The conference was co-sponsored by the University of Washington and URI.

Two centuries of history and a present day sociological study of the Rhode Island fishing community, Gali-

lee, are presented in a recently published book titled, **Fishermen of Galilee**. The book is the result of a study by two University of Rhode Island professors, John J. Poggie, Jr., an anthropologist, and Carl Gersuny, a sociologist. The 116-page illustrated book has been published by URI's Sea Grant program.

Beginning with the Indians and early settlers who fished the salt ponds and the shore with small nets, the authors recount the history of the community through its hardships until the present day prosperity with a small, highly mechanized fleet. The authors examine the present-day community in terms of human ecology which they believe is the most useful approach in understanding maritime occupational cultures.

Gersuny and Poggie tell how Galilee has coped with 20th century economic conditions with harbor improvements and a new fishermen's cooperative. Taboos, the URI social scientists write, have enabled the fishermen to contend with the danger and uncertainty of their occupation. Many of their observations are based upon interviews with fishermen and a number of textile factory workers.

By comparing fishermen with factory workers, the social scientists found out that the fishermen have an unusual basic love for their occupation. "It would appear," Gersuny and Poggie say, "that the fishermen consider success and advancement in their occupation to be the main source of reward in their life, whereas the sense of the mill workers' responses indicates that they would like to have enough money to be free of their occupation."

Independence, challenge, disdain for regimentation and love of the outdoors are valued highly by fishermen while factory workers concern themselves with the steadiness of their work, the regular hours and security, the authors state. "In a sense," they write, "fishing is indeed a modern version of the primordial life way of our species—the hunting and gathering way of life. Perhaps in many ways, man is structured to be a hunter more than he is to be part of bureaucratized life in urban industrial society."

Copies of "Fishermen of Galilee" are available at a cost of \$3 each. Requests for publication P346 should be mailed to the Marine Advisory Service, University of Rhode Island, Narragansett Bay Campus, Narragansett, RI 02882. Copies of the Floating Breakwaters Conference, Proceedings, publication No. P347, are available for \$5 each from the same source.

Bristol Bay Study Is Published

A new report published by the University of Alaska's Institute of Social, Economic and Government Research (ISEGR)—**Bristol Bay, A Socioeconomic Study**—surveys the socioeconomic characteristics of that Alaska region. Compiled and written by economist David T. Kresge and research assistants Susan R. Fison and Anthony F. Gasbarro, the report was originally prepared under contract to the U.S. Army Corps of Engineers as part of a larger report, "The Bristol Bay Environment, A Background Study of Available Knowledge."

The original study was intended to provide background information for possible inclusion in environmental impact statements relating to petroleum development in Bristol Bay. The new ISEGR report explores seven major categories of socioeconomic importance: population and education; labor force and employment; income and cost of living; housing and public services; industrial activity; transportation facilities and costs; and land use and land status.

ISEGR has published the report as part of its Man in the Arctic Program, a long-range research effort intended to develop a basic understanding of the forces of change in Alaska and to apply this understanding in dealing with the critical problems of social and economic development. ISEGR has chosen Bristol Bay as a region in which further intensive research will be carried out under the Man in the Arctic Program. Its new report, as a compilation of available current information and historical data, will serve as a baseline for further studies in which socioeconomic data not presently available will be compiled and analyzed. Copies of the report can be obtained from ISEGR at \$5 each.

New Aquaculture Magazine Debuts

Four fish farming magazines were combined last fall into one new, bimonthly publication, *The Commercial Fish Farmer and Aquaculture News*. The first issue (September-October 1974) was published last fall and distributed to the combined circulation lists—more than 14,000 persons—of the predecessor publications.

The new magazine, largest of its kind in the world and devoted exclusively to fish farming and aquaculture, is a consolidation of *The Catfish Farmer*, *Fish Farming Industries*, *American Fishes and U.S. Trout News*, and *The American Fish Farmer and World Aquaculture News*. *The Catfish Farmer* was the official publication of the Catfish Farmers of America, the Little Rock, Arkansas-headquartered national trade association of the catfish farming industry. *American Fishes and U.S. Trout News* was the official publication of the U.S. Trout Farmers Association which was headquartered in Washington, D.C. until last fall. *Fish Farming Industries* and *The American Fish Farmer and World Aquaculture News* were independent publications. The new magazine will be the official publication of the Catfish Farmers of America.

Publisher and general manager of the new publication is Porter Briggs and the editor is Maurice Moore. Publication offices are at 530 Tower Building, Little Rock, AR 72201.

U.N. Water Resources Materials Are Listed

A checklist describing some 200 United Nations System publications on water is now available from Unipub, U.S. distributor for publications of the United Nations System, and related publishing programs. Subjects covered in the checklist include irrigation, desalination, climatology, water pollution, environmental protection, waste disposal, nuclear applications in agriculture, and hydrology. The information is presented in books, maps, and microform.

Copies of the water resources checklist are available free of charge from: Unipub, Box 433, Murray Hill Station, New York, NY 10016.